

# Quantitative Impurity Distribution Model and Field Response Calibration for LArTPC

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## **Abstract**

Achieving long electron lifetime is crucial to reach the high performance of large Liquid Argon Time Projection Chamber (LArTPC) envisioned for next-generation neutrino experiments. We have built up a quantitative model to describe the impurity distribution and transportation in a cryostat. Henry's constants of Oxygen and water, which describe the partition of impurities between gas argon and liquid argon, have been deduced through this model with the measurements in BNL 20-L LAr test stand. These results indicate the importance of the gas purification system and prospects on large LArTPC detectors will be discussed. Furthermore, we will describe the ongoing work to construct Liquid Argon Field Calibration System (LArFCS) aiming for a direct calibration of the induction impulse field response function. The results from this new system is expected to significantly improve the induction signal processing of the single-phase LArTPC and build a solid foundation for the automated event reconstruction.